

AIR WAR COLLEGE

AIR UNIVERSITY

END STATE

THE FALLACY OF MODERN MILITARY PLANNING

by

Jeremiah R. Monk, Colonel, USAF

A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

Advisor: Michael J. Sierco, Colonel, USAF

6 April 2017

DISCLAIMER

The views expressed in this academic research paper are those of the author and do not reflect the official policy or position of the US government, the Department of Defense, or Air University. In accordance with Air Force Instruction 51-303, it is not copyrighted, but is the property of the United States government.



Biography

Colonel Jeremiah Monk is assigned to the Air War College, Air University, Maxwell AFB, Alabama. Colonel Monk earned his commission from the United States Air Force Academy in 1995. He is a master navigator with more than 3300 flying hours in the C-130E and MC-130H Combat Talon II, and has deployed for combat operations in the Balkans, Southwest Asia, Iraq, Afghanistan and Colombia. Colonel Monk commanded the 66th Training Squadron, Fairchild AFB, Washington, where he was responsible for the daily operations of the USAF Survival, Evasion, Resistance, and Escape technical training program. Prior to attending Air War College, he served at Headquarters US Special Operations Command, MacDill AFB, Florida, as Chief of Emergent Force Requirements, Deputy Chief of the Commander's Action Group, and as a Strategic Planner.



Abstract

Joint Operational Planning, the current military planning doctrine prescribed by Joint Publication 5-0, is linear and mechanistic by nature, and grounded in industrial age warfare. The process is predicated upon the pursuit of specific terminal end states, from which planners work backwards to identify a linear sequence of enabling objectives. This method is effective for straightforward military operations and contingency planning, but is wholly inadequate for situations when a terminal end state is not readily apparent. The modern and future geopolitical environment is a complex, changing, and unpredictable web of interactions, which cannot be approached in a linear, mechanistic manner by a universal planning methodology.

Theater/global campaign plans and theater strategies offer no such end state, for they are naturally complex and unending. However, planning doctrine makes no discrimination between the two very different strategic environments, and instead prescribes a universal linear methodology that pays no mind to strategic complexity. This universal application leads military planners to apply mechanistic planning efforts to complex strategic problems, which can have disastrous consequences. As the geopolitical environment becomes increasingly interconnected, dynamic, adaptive, and complex, senior leaders require and deserve a true range of options to address these complex situations. Military planning doctrine is therefore in need of a revolution in order to be more responsive to the evolving strategic environment.

*Now, in his heart, Ahab had some glimpse of this, namely: all my means are sane,
my motive and my object mad.*

- Herman Melville, Moby Dick

I. Introduction

Joint Publication 5-0, the foundational doctrine of modern military planning, opens with a timeless quote from then General Eisenhower: “plans are useless, but planning is indispensable.”¹ The introduction to the publication by former Chairman of the Joint Chiefs of Staff Admiral Mullen adds “the operational environment is not simple or static, adaptation and flexibility are necessary in planning and execution.” From that point forward however, JP 5-0 ignores its own opening course and lays out a mechanistic military planning process reflective of a bygone age. Current military planning doctrine is detail-oriented and solidly grounded in linear industrial age warfare. As Admiral Mullin noted, however, the operational environment is not. The modern and future geopolitical environment is a complex, dynamic, and unpredictable web of interactions, which cannot be approached in a linear, mechanistic manner by a universal planning methodology. Military planning doctrine is in need of a revolution in order to be more responsive to the strategic environment of the future.

II. Joint Operational Planning

Orientation

To understand the problem we must first understand the current doctrinal hierarchy of military planning (figure 1). At the top of the strategic planning process, the Joint Strategic Planning System exists to create high-level documents such as the National Military Strategy,

Guidance for Employment of the Force, and the Joint Strategic Capabilities Plan. These strategic documents provide broad and open-ended guidance on the construct and employment of the force. Using these guidelines, the Combatant Commanders develop theater and/or global strategies and campaign plans, dependent on the scope and function of the particular combatant command.

Geographic Combatant Commands develop these strategies to achieve specified *end states* for their theaters.³

To achieve these end states, combatant commands conduct two types of planning: crisis and deliberate, the primary

difference between the two being time available. Crisis planning is conducted when required and directed, and is execution-oriented. Deliberate planning is a cyclic process that encompasses global/theater campaign planning as well as contingency planning (figure 2). Contingency planning is targeted to identify requirements and action associated with specific operational scenarios. Global/theater campaign plans set a roadmap to achieve objectives in support of the stated goals of the global/theater strategy. These campaign plans are the centerpiece of the Defense Department's planning construct, and link ongoing military activities and contingency

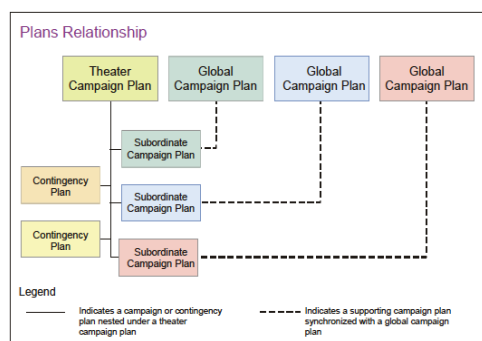


Figure 2: Plans Relationship⁶

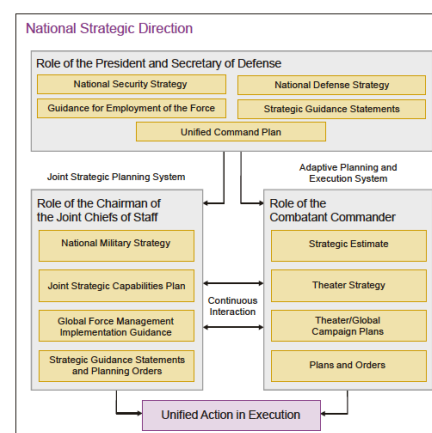


Figure 1: National Strategic Planning Hierarchy²

plans to the Commander's larger strategy.⁴ As the doctrine states, the ultimate focus of campaign plans is to accomplish specific objectives within a given time and space.⁵

Deliberate and crisis plans are developed in accordance with the Joint Operational Planning Process (JOPP), as described in JP 5-0.⁷ JOPP is a set of seven sequential steps to examine a mission; develop, analyze, and compare alternative courses of action (COA); select the best COA; and produce a plan or order (figure 3).⁸ At its core,

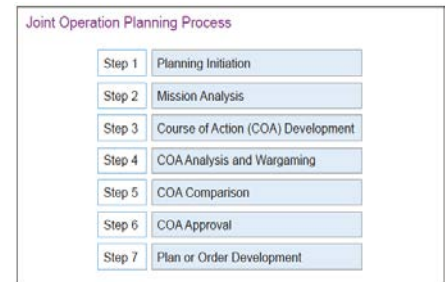


Figure 3: Joint Operational Planning Process¹¹

JOPP is a linear and objective-oriented approach. “JOPP is an *orderly, analytical process* through which the JFC and staff translate the broad operational approach into detailed plans and orders”⁹ the doctrine states. “Joint planning is *end state oriented*...plans and orders are developed with the strategic and military end states in mind.”¹⁰

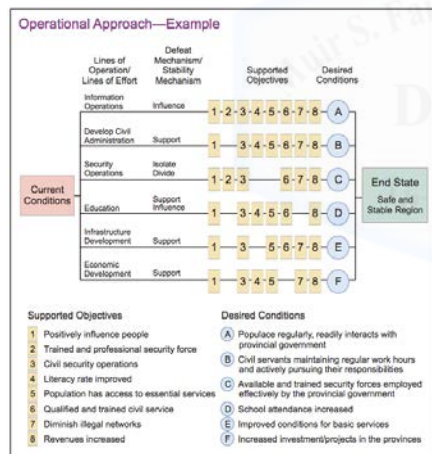


Figure 4: Operational Approach Example¹²

The Joint Operational Planning Process is initiated after development of a conceptual *Operational Approach* (figure 4), described as “a commander’s description of the broad actions the force must take to achieve the desired military end state.”¹³ The Operational Approach is devised through a method termed *Operational Design*, defined as an “iterative process...to help planners answer ends—ways—means—risk questions and appropriately structure campaigns and operations.”¹⁴ The resulting Operational Approach forms a conceptual script of objectives for a particular operation or campaign. The model is developed backwards from a desired end state, and requires a planner to identify key elements such as desired conditions, lines of effort (LOEs), decisive points, and progressive intermediate objectives required to achieve that end state.

In application of the Operational Approach, planners sequence the operation into operational “phases.” These phases are intended to illustrate the linear progression of a particular campaign or operation, divided into distinct periods defined by the level of military effort¹⁵ (figure 5). This subdivision then enables logistic planners to build force deployment plans to support the specific plan.

The Operational Approach and phased force deployment model are the central outputs of the operational planning process. Understanding these process mechanics is essential, but mechanics are only one aspect. We must also explore the foundational attributes and orientations of the doctrinal planning process.

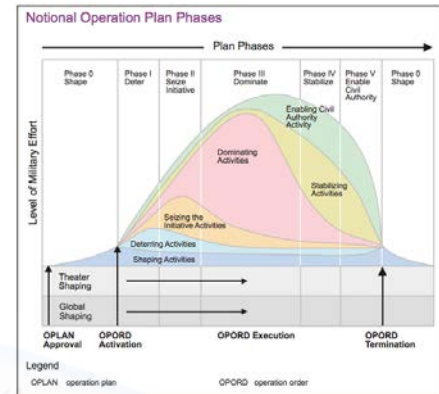


Figure 5: Operational Plan Phasing¹⁶

Characterization

There are four fundamental characteristics of the current planning method, the first being its inherent *linear nature*. JOPP essentially mechanizes the application of military power by employing the logic of Newtonian physics.¹⁷ The model is formulaic by nature: if objectives 1 through 8 are successfully achieved then the resultant state “A” will be realized, which in combination with achieving objectives B through F (in figure 4) will produce the desired end state. However, Newton’s first law of physical motion was never intended to describe the working of a complex, adaptive, and non-linear environment. Likewise, the current planning construct does not account for the extensive unintended consequences that could result from actions taken, for unforeseen adversary reactions, or a myriad of other variables that characterize a complex and adaptive system.

The second characteristic of the process is a *scientific and mechanistic heritage*, a direct descendent

of Jominian warfare. Following the Napoleonic Wars,

Baron de Jomini aimed to describe a prescriptive and

formulaic framework by which to approach warfare, to which Antoine Bousquet later drew the

analogy to the workings of a clock.¹⁹ Mechanistic warfare views the world as a machine, in

which Newtonian laws apply in a linear and predictable manner. The view stems from an age of warfare in which man sought to impose order via a programmed and centralized routine.

Bousquet explains how advances in technology have driven the metaphorical characteristics of war through the ages past the mechanistic – from thermodynamic (engine), to cybernetic

(computer), to chaoplexity (network) – the latter being the current and future operating

environment that seems to be at odds with the mechanistic character of the planning doctrine.²⁰

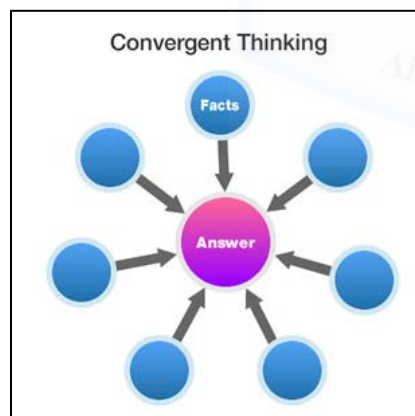


Figure 6: Divergent and Convergent Thinking Models²¹

The third characteristic is *convergence*. Convergent

thinking is defined by Phil Charron as “the practice of trying

to solve a discrete challenge quickly and efficiently by

selecting the optimal solution from a finite set.”²² This style

of problem solving is structured to use known information and

best practices to arrive at a single “right” answer. This form of

thought is clearly reflected in the planning process

methodology, which prescribes planners to gather information

and develop a course of action to achieve a specific singular objective.

Related to the third characteristic, the fourth is the *supremacy of the objective*. In

framing operations as sequential formulas to be “solved,” the model orients the planner to the

“Military science rests upon principles which can never be safely violated in the presence of an active and skillful enemy”¹⁸

- Baron Antoine-Henri de Jomini

task of designing sequential steps to achieve a terminal end state. Likewise, as the phasing model focuses the significant effort required to “dominate” in phase III, it leads the planner to perceive all other phases as existing to either support or recover from a major combat operation, which in turn reinforces a mechanistic planning process. As a result, the military end state of the operational plan usually coincides with the military objective at the conclusion of phase III, which historically and detrimentally has resulted in minimal whole-of-government planning for the stability and civil authority handover phases, both critical for success.

The phasing model is also constructed in reflection of the mechanistic process. Phases are intended to represent a natural progression from one operational condition to the next.²³ In application, however, activities of several phases may run concurrently, or non-sequentially. In a counterinsurgency campaign, for example, shaping, deterrence, seizing initiative, domination, stabilization, and enabling of civil authority activities may all be non-sequential or simultaneous. As it exists, the phasing doctrine forces a simplistic two-dimensional model upon a complex, four-dimensional environment. It also defines phase 0 as a preparatory phase for later combat activities, instead of as an environment unto itself. The phase model oversimplifies environmental complexities, which misleads planners to focus on linear, end-state driven efforts.

These characteristics of the current planning process all point to a critical flaw. The current planning process is founded on the assumption that planners will have a clearly defined objective. Thus, planners predicate their efforts on determining this objective. But when the objective is not so clearly defined, this key assumption can completely undermine the effectiveness of the planning process.

The Elusive End State

When planning and executing a military operation with specific, identifiable, and achievable objectives, the aforementioned characteristics generally do not pose a problem. In fact, JOPP is very well suited to the sequencing of military actions to achieve specific, limited operational objectives. The requirement for success is the identification of an achievable end state. Contingency and crisis planning efforts generally offer an end state, and therefore largely fall into the realm for which JOPP is ideally suited. For example, when planning to invade the beaches of Normandy, to mount a counter offensive on the Korean peninsula, or push an invading army out of Kuwait, JOPP is superb tool to use to formulate a plan for victory.

However, when there is no readily identifiable or achievable end state, if the mission requires application of power beyond just military force, or if the situation remains below the threshold of a conventional military response, JOPP offers a poor and potentially perilous solution. Theater/global campaign plans and theater strategies fall into this category, and offer no such identifiable end state. There is no “victory” to be achieved. Time does not stop, nor does the complex web of geopolitics, and therefore the campaign will never end. In these situations, the military is not the only actor on the stage, and often not even in the lead.

If we accept Carl von Clausewitz’s theory of war as an extension of politics, then we can infer strategic political maneuver does not necessarily stop when a military “end state” is reached. In fact, Clausewitz arrived at this same conclusion:

“War is simply a continuation of political intercourse, with the addition of other means”²⁴

- Carl von Clausewitz

“Lastly, even the ultimate outcome of a war is not always to be regarded as final. The defeated state often considers the outcome merely as a transitory evil, for which a remedy may still be found in political conditions at some later date.”²⁵

Current planning doctrine is predicated upon the goal of achieving a particular “end state,” which is appropriate for limited operational objectives. But because planning doctrine does not distinguish between operational, strategic, linear, or non-linear efforts, planners apply it uniformly. When planning theater strategies or campaign plans, this critical omission forces pursuit of an unattainable goal, which drives a convergent planning effort towards an unachievable end state. Through its universally prescriptive nature, the current method conceals viable alternative options, obfuscates potential ramifications, and drives momentum towards the climactic domination operations of phase III, often at the expense of other options or planning for follow-on phases. Worse, this preoccupation with achieving the military end state can

*“You pay attention to the day after
and I’ll pay attention to the day of.”²⁶*

- General Tommy Franks

actually lead to mission failure. Take, for example, the catastrophic results of the 2003 invasion of Iraq to remove Saddam Hussein, and the 2011 airstrike in Libya that toppled the Gadhafi regime. In both cases planners failed to consider the second and third order consequences of military action that destroyed the stable order, created power vacuums and unleashed social chaos. The current effort against the Islamic State is aimed to achieve an objective of defeat, yet the effort largely ignores the obvious fact that the larger, causal problem in Syria offers little chance of a clean, terminal victory. Yet despite these strategic failures, and the obvious complexity of the environment, current planning doctrine dogmatically persists.

III. Complexity and the Modern Strategic Environment

The U.S. Department of Defense is a rational, analytic, and hierarchal organization, with a distinct mechanistic Jominian heritage. It was designed to confront similarly organized nation-state opponents, and thus it is logical that it would adapt a scientific-based planning process.

However, this process has difficulty confronting the non-hierarchical, networked, swarming threats typical of the modern environment. In these complex environments, following modern planning doctrine is much like chasing after a mirage. The geopolitical world is not linear or mechanistic, but complex, multifaceted, and unpredictable. Attempting to achieve a particular outcome within such a dynamic environment through application of a mechanistic approach ignores the complex nature of geopolitics. Rather than apply a one-size-fits-all approach, planners must better understand the nature of the environment in which they must operate. Fortunately, there are several models that can help planners understand the complexity of the modern operational environment.

The Butterfly Effect

In the early 1960's Edward Lorenz, a weather researcher at the Massachusetts Institute of Technology, attempted to create a program for predictive weather modeling. Through a rounding error, he stumbled upon the mathematical discovery that small changes to initial conditions within a non-linear dynamic system can have significant effects. His finding came to be called the "Butterfly Effect," which led to the development of a branch of mathematics now known as *deterministic chaos theory*. In summary, the theory states "while it may not be possible to solve or predict the future of a nonlinear system, it is possible to provide a qualitative description of its characteristics and behavior as a whole over time."²⁷ A drop of water on a spider's web will cause reverberations throughout, but the web will naturally settle to a stable state. Chaos theory explains that the path to stability of the web cannot be predicted (or imposed), but the overall behavior can be explained.

Chaos theory helps describe the non-predictable nature of non-linear dynamic systems, such as weather patterns or biological development. It can also be used to explain elements of sociological and geopolitical behavior. Chaos theory explains how the application of force within a geopolitical system can cause unpredictable disturbances well beyond the intended effect. Though Chaos theory doesn't offer a method to predict the *how* the system will change, it can help highlight *why* the system reacts the way it does, which can help planners understand and characterize the environment. Therefore, the key to working within non-linear systems lies not in obtaining quantifiable data about the vibrations, but rather through examining interactions and linkages to understand the nature of the system. This is especially true in today's hyper-connected information environment.

To help explain *how* a system will be affected, planners can look to a close relative of Chaos theory. Based on the principle of *self-organization*, Complexity theory explains how self-propagating systems tend to settle into some sort of order, and do so without external influence.²⁸ Examples are birds organizing into orderly formations, or sand settling into dunes. While the specific shape and character of the order is unpredictable, Complexity theory shows that the system will adapt and settle, in some way. What that end result will be, however, is dependent upon the complex, dynamic interactions of the numerous uncontrollable elements within the system – which in a complex environment may be very different than the intended outcome.

Emergence

The concept that complex adaptive systems will organize into order is known as *Emergence*. Emergence is perhaps best exemplified through Charles Darwin's theory of evolution, in which species develop over generations not toward an identified end state, but

rather in reaction to their environment in order to ensure the best chance of survival.²⁹ The concept of emergence requires an embrace of the unknown, not of the objective. Kenneth Stanley and Joel Lehman help explain the concept of emergence through a metaphor of stepping-stones, where incremental steps must be taken to unlock new, unseen potentials.³⁰ Creation of cell phones, for example, required several completely unrelated stepping-stones before the possibility was realized (electricity, vacuum tubes, microprocessors, satellites, etc). This path could not have been planned before these stepping-stones were revealed. Greatness, therefore, comes not from pursuit of an objective, but rather through analysis and understanding of the current (emerging) environment, and openness to exploring new paths. Like strategic planning, short-term objectives are valid (i.e., the next stepping stone), but setting a long-term course in a complex, emergent environment is generally futile and overlooks key opportunities. Furthermore, in complex, adaptive environments, the path toward a particular objective is often *not* the most obvious. Conversely, like in a maze, setting out of the most direct path will often result in failure.

Wicked Problems

While emergence, chaos theory, and complexity theory help describe the overall behavior of a system, there is another way to help explain the dynamics of distinct problem sets within that system. A “wicked problem” is a category of a situation that is characterized by the lack of a definable or achievable “solution.”³¹ The ongoing Palestinian conflict, trans-regional organized crime, the Islamic State problem, and its empowering global foreign terrorist fighter flow are all examples of contemporary wicked problems. These issues all have an incalculable number of variables, actors and sides, and like all wicked problems they are inherently unique.

Most political or societal problems fall into the wicked category. Therefore, by extension of Clausewitz, most military problems can be viewed as part of larger political wicked problems. “The classical paradigm of science and engineering -- the paradigm that has underlain modern professionalism,” explain the authors of the concept, “is not applicable to the problems of open societal systems.”³² Like chaos theory, wicked problems are non-linear. They can never be “solved,” but can only be realistically stabilized and managed toward a state that is “good enough.” Doing so, however, requires a comprehensive understanding of the context, as well as a thorough understanding of the linkages and non-linear effects within the system.

The web of geopolitics can generally be described by both chaos theory and the concept of wicked problems. Ramifications of political actions are never linear, nor are they constrained by time, geography, or discrete domains. Embarking on a military action is akin to touching the spider’s web – there will be unpredictable vibrations, but the geopolitical system will generally reorder in some fashion. What that resultant state is, however, may be very different from the end state that the military action was intended to achieve. Planning a linear operation in a non-linear environment, therefore, is essentially an attempt to force a predictable outcome from an unpredictable system.

Hybrid Warfare

Much like the nature of the geopolitical environment and strategic problem sets, warfare itself is becoming increasingly non-linear. States and non-state actors increasingly employ surrogate forces, cyber attacks, economic and legal warfare, and information manipulation to achieve their goals. As nations and non-state actors increasingly embrace non-linear approaches to secure their interests, the style of conventional, linear, Jominian warfare become increasingly

improbable. Clausewitz predicted this shift in the character of war. “War does not belong in the realm of arts and sciences,” he stated, “rather it is part of man’s social existence.”³³ He described war as a “chameleon” that changed character, but maintained its nature as a political instrument. Because the geopolitical environment has become increasingly non-linear, one can reasonably expect the character of war to follow suit.

Evidence can be found in statements from near-peer competitor states. Two have already published their intentions to diverge from the linear ways of conventional warfare. In their prophetic 1999 book *Unrestricted Warfare*, Colonels Qiao Liang and Wang Xiangsui of the Chinese People’s Liberation Army prescribed a “combination method” of preemptive capital accumulation, financial and cyber attack, and an informational campaign designed to “cause the enemy nation to fall into social panic, street riots, and a political crisis.”³⁴ China is aware of and intentionally operates below the thresholds of conventional deterrence. In their recent island-building campaign in the South China Sea, China has shown how they intend to pursue their strategic interests through unconventional means. Using fleets of Coast Guard vessels and construction barges, China is working toward a position of regional hegemony over critical sea-lanes and fishing grounds, without using military force, and in such a way to avoid a conventional military response.

Russia has also demonstrated their preference toward unconventional methods. As employed in the 2014 Ukraine invasion, Russia employed an orchestrated combination of surrogate forces, misinformation, deception, cyber, and political warfare, all to set conditions for conventional forces to “respond” ostensibly in a “peacekeeping” role. Though Russia originally denied involvement in Ukraine, Chief of the Russian General Staff General Valery Gerasimov later detailed the Russian method in describing Russian actions in Syria in 2016:

“In today's conflicts, the focus of the methods used in combat is increasingly shifting towards the integrated application of political, economic, informational and other non-military measures, implemented with the support of the military force. These are the so-called hybrid methods.”³⁵

Both Russia and China have demonstrated prowess in asymmetric operations designed to cause disarray and confusion, and confound the Western decision making process. In doing so, both have achieved territorial objectives while avoiding a conventional military response through non-linear approaches.

Enter the Gray Zone

These hybrid approaches have not gone unnoticed by the U.S. military. Shortly after the Russian operation in Ukraine, General Joseph Votel, Commander of United Special Operations Command, offered an initial concept for understanding and operating in this type of strategic environment. “The Gray Zone,” he explained, “is characterized by intense political, economic, informational, and military competition more fervent in nature than normal steady-state diplomacy, yet short of conventional war.”³⁶ The Gray Zone concept is metaphorical, indicating that we cannot clearly explain what we perceive, or even conceive, the full scope of the operating environment. These types of conflicts therefore perplex the current end-state oriented planning doctrine:

“A Gray Zone ‘win’ is not a win in the classic warfare sense. Winning is perhaps better described as maintaining the U.S. Government’s positional advantage, namely the ability to influence partners, populations, and threats toward achievement of our regional or strategic objectives. Specifically, this will mean retaining decision space, maximizing desirable strategic options, or simply denying an adversary a decisive positional advantage.”³⁷

There is another way to describe the Gray Zone – normal complex geopolitics. Gray zone conflict is the norm of international competition. It describes day-to-day operations that U.S. forces are currently engaged in around the world. The Gray Zone is the natural operating environment of the theater campaign plan. Unfortunately for the military planner, planning doctrine offers no tools to plan operations in this murky environment. There are no determinate end states in the Gray Zone, and theater campaign plans offer no such thing as a “win.”

United States Special Operations Command has proposed changes to planning doctrine to account for primacy and independence of Gray Zone operations.³⁸ The proposal notes the major deficiencies of the current phasing model: the subordination of phase 0 operations to “shape” the battlefield for subsequent phase III domination operations, and the end-state driven linearity. However, this proposal does not go far enough, as it remains within the basic framework of the phasing model by recommending an increased focus on phase 0 operations. The future strategic environment demands an entirely new strategic planning framework.

Planners need an alternative framework to properly account for the differences of non-linear environments. Gray Zone operations must come to be regarded not as phase 0 shaping operations, but rather as the primary operating environment. War is generally something to be avoided if possible, so the current phasing model should therefore be regarded as a branch plan activity – to be employed only when Gray Zone efforts are unsuccessful. Contingency planning efforts must not eclipse the daily pursuit of long-term theater campaigns strategies.

Options

In reviewing military options for the 2009 Afghanistan surge decision, President Obama grew frustrated with the limited range of options presented to him. The Defense Department had

offered merely a range of force levels: small, large, and “just-right.” All of these options were based on military planning towards an undefined objective. “We don’t have an end state,” Obama said. “I don’t see it

“I have one option that was framed as three options,’ Obama told the chiefs. ‘I want three real options to choose from.”⁴⁰

clearly...the plan is too open-ended. There is neither victory nor defeat in 10 years.”³⁹ Political leaders need – and deserve – options beyond a range of troop levels. Political leaders need options that reflect desired effects - not end states. Likewise, in Gray Zone environments, military operations must fall in line with the goals of the U.S. Foreign Service country team. Political leaders and Ambassadors do not work with end states in mind, but towards a desired state of affairs. Said one State Department official:

“State values end-states a bit differently, and is often thinking about alternatives that might also be politically acceptable, not just for the US but for other parties as well, without requiring the use of all the resources necessary. We’re often comfortable with intermediary solutions that don’t always solve the problem set entirely, so long as they don’t give away too much.” [DoD should look to] “find ways to build additional flexibility into joint planning, based on the fog of evolving situations, for potential off-ramps and/or alternative solutions.”⁴¹

Current U.S. planning doctrine is incompatible with the needs of U.S. political leaders and Foreign Service officials. It does not provide the necessary tools and flexibility to plan military operations in complex environments such as the Gray Zone, against hybrid threats, or wicked problems. As stated by Rittel and Webber in their discussion of wicked problems,

“The professionalized cognitive and occupational styles that were refined in the first half of the century, based in Newtonian mechanistic physics, are not readily adapted to contemporary conceptions of interacting systems and to contemporary concerns with equity... a weak strut in the professional’s support system lies at the juncture where goal-formation, problem-definition and equity issues meet.”⁴²

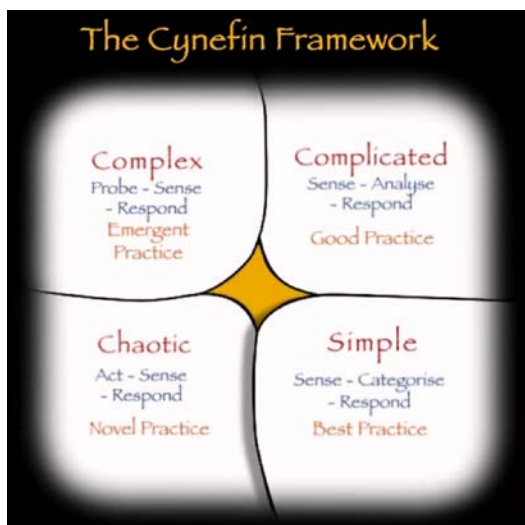
For today's complex geopolitical problems, the U.S. military needs to adopt an alternative means to understand and operate within wicked environments.

IV. Complex Approaches for a Complex World

Such complexity calls for a more adaptive and dynamic planning process. This new doctrine must first help planners characterize and understand the environment in which they must operate. Then, the doctrine must allow planners flexibility to use the methods that are best suited for those different environments. Operations that have identifiable end states should continue to use JOPP. However, those that do not should proceed by a more suitable method. And to decide which path to follow, planners need a tool to help characterize the strategic environment.

The Cynefin Framework

Doctrine must account for the different types of strategic environments, and permit flexibility to apply the appropriate methodology. Doing so requires planners to first evaluate the environment. One model for understanding the nature of the strategic environment is the “Cynefin Framework.” [pronounced “Kin-ev-in”]. Developed by Cynthia Kurtz and David



Snowden in 2003, the model is a “sense-making” framework for understanding the levels of complexity associated with various natural environments. The concept challenges the basic assumption of a cause-and-effect relationship inherent to the development of strategy.⁴⁴ As shown in figure 7, the model consists of five domains, each of which describes a strategic

Figure 7: The Cynefin Framework⁴³

context characterized by different cause-and effect relationships.

The “Simple” quadrant in the lower right represents basic, linear cause-effect relationships, where the applied action and resultant effect are both knowns. Repeatable, predetermined organizational activities fall within this range. The optimal response actions are Best Practices and Standard Operating Procedures, executed in accordance by a “sense-categorize-respond” action methodology. An example of such a best practice would be implementation of a standardized aircraft checklist procedure.

Moving counter-clockwise in order of environmental complexity, the next quadrant is the “Complicated” domain. In this domain, there may be several solutions to a particular problem, albeit in a linear fashion, and the objective is to reveal the unknown path that best achieves the known result. Cause and effect are separated and harder to foresee, and thus require an additional level of analysis. The most effective approach for this domain, therefore, is to evaluate the available information, analyze the options for action, and develop a plan of action to achieve an established desired objective, in a “sense-analyze-respond” methodology. An example of this domain is an aircraft flight route, for which there are many acceptable options that offer different advantages, all towards the same end. This is also the methodology predominant to modern military operational planning doctrine.

Moving from the realm of “order” to “un-order,”⁴⁵ the next domain is the “Complex,” inherently characterized by unknown unknowns. Order exists, but is established not through application of pressure, but instead by natural balancing. Cause and effect relationships exist but form a web of consequences in which the patterns are initially obscured, are not necessarily repetitive, and therefore cannot be predicted. Therefore, standardized methods and ordered approaches do not work in this domain. Instead, the agent must apply a “probe-sense-respond”

methodology to determine the appropriate patterns and cause-effect relationships, and then act within those emergent patterns. One can perceive actions in this domain as touching a spider's web and observing the reverberations. A good way to approach the Complex domain is to establish boundaries to action (e.g., don't step on the web), and work within the limits of those boundaries through experimentation, innovation, interaction, flexibility, and patience with the goal of establishing a favorable emergent natural order. The Gray Zone strategic environment is usually complex in nature, and thus a "probe-sense-respond" approach is most appropriate.

The final two domains are those we hope to avoid in the military planning process. In the bottom left, the chaotic environment offers a domain characterized by unknowable variables in which no cause and effect relationship or identifiable patterns exist. This domain demands rapid action to stabilize the situation in an "act-sense-respond" methodology, and the agent must respond quickly to reactions. Entry into this domain is usually induced by misapplication of a standard operating procedure to a complex environment. Lastly, in the center, is the domain of dis-order. Dis-order is the starting point, when the observer does not yet know which quadrant governs the current environment. Entry into this domain also occurs when there is disagreement upon which domain is actually relevant, as based on perspective. Tension occurs when planners attempt to force characterization of a particular environment into an incorrect quadrant.

One idiosyncrasy of the Cynefin framework is that location is not necessarily singular. A singular problem can have aspects that exist in multiple domains simultaneously. The catch is to identify the particular domains of the various aspects of the environment, and address them by the appropriate method. Doing so enables planners to separate the complicated elements from the complex, then form linear plans for the complicated elements while still working on the larger complex issues with a probing approach.

Ultimately, military planners must think and plan according to the actual environment in which the operation will occur, as opposed to the environment that is desired. The Cynefin framework provides a means for identifying the strategic environment, and offers a way to tailor the planning method to a methodology that is most applicable to the environment at hand. Once the environment is identified as being complex, and the appropriate “probe-sense-respond” approach determined, planners need a process alternative to JOPP by which to proceed.

Design Methodology

The U.S. Army and the United States Special Operations Command have found limited success with one such alternative planning model over the past decade. The methodology known as *design thinking* grew out of the concept of Systematic Operational Design developed by

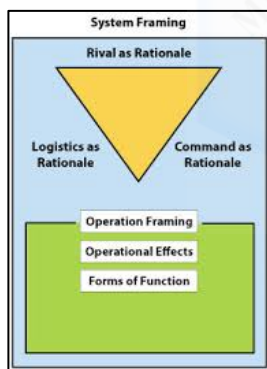


Figure 8: Naveh's Original Systematic Operational Design Model ⁴⁶

Shamon Naveh of the Israeli Defense Force in the late 1990's. Not to be confused with the doctrinal Operational Design, design thinking is a non-linear, creativity-based method to approach wicked problems.

While JOPP is rooted in science and mechanics, design is more of an art form. The process is grounded upon creativity and innovation. It

starts with gaining a comprehensive understanding the problem as it relates to the end customer, followed by brainstorming of solutions, identification of patterns, prototyping, then testing of ideas. Contrary to the linear, convergent method of solving problems, design is based on *divergent* thought, where multiple solutions are explored and compared with the end result as an unknown.

There are two keys to successful incorporation of design thinking into military planning doctrine. The first is a necessity for a distinction between the two methods. Design cannot be

considered a subset of either JOPP or Operations Design.

Likewise, design-based concepts cannot be subsequently

forced into a JOPP-style operational order or

contingency plan. Because design is a divergent and emergent process, it offers no target end

state or scripted objectives. The process is a continuous, adaptive, and responsive spiral. The

deliverable product must therefore be flexible and responsive to testing and adaptation. In

execution, this can only come through incorporation of the customer into a real-time, feedback-driven planning process.

*"We cannot solve a problem by using
the same kind of thinking we used
when we created them."*

- Albert Einstein

The second requirement is incorporation of different perspectives from the beginning of the planning effort. Planning groups must avoid homogeneous thought, as military planning cells often tend to have. The group must be diverse, to include members of other government agencies, Foreign Service representatives, partner nations, non-governmental organizations, corporations, and others with equities. True design planning must go beyond inviting representatives from these organizations for token participation, but must include them as equal partners. In fact, as most wicked problems are not primarily military related, planning should be oriented to support State Department-led objectives.

Risk

The cost of adopting design planning is an adjustment of risk tolerance. Design methodology requires commanders to accept and expect broad and repeated failure. Initial concepts must be tested and examined to determine the effects, in particular the resultant reverberations to the complex system. Doing so requires dedication to decentralized execution and full empowerment and support of subordinates. As illustrated by the concept of emergence,

*"I haven't failed. I've just found
10,000 ways that won't work."*

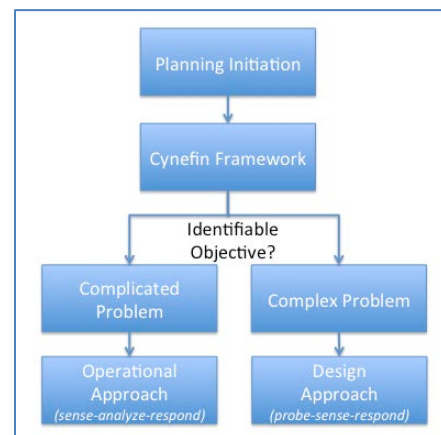
- Thomas Edison

a “probe-sense-respond” methodology may require many initial failures before a solution is discovered.

This cost is offset by the greater alternative cost of misemploying the Operational Approach method. Risk associated with linear planning is binary. In a linear process, if the intended end state is not achieved, then the mission has failed. There is no second chance, and limited opportunity to change course once executed. By applying design methodology, the risk of initial failure is more likely, but the impact is mitigated through diversification of smaller test cases and flexible adaptation. To adopt design practices, commanders must be willing to accept numerous small failures before discovering a successful option, in accordance with the “probe-sense-respond” approach for confronting wicked problems.

IV. Recommendations

1. *Complex planning for complex problems.* Linear approaches are not well suited to approaching non-linear problems. Doing so can actually result in severe unintended consequences. Instead, strategic or operational planning for non-linear, complex scenarios requires application of non-linear, advanced planning techniques such as design methodology or scenario planning. Military planning doctrine must evolve accordingly beyond its current one-size-fits-all approach. At a minimum, the next evolutionary branch of planning doctrine must acknowledge that current Operational Design and JOPP



**Figure 9: Proposed planning vector
diagram**

are not universally applicable. Doctrine must offer other options for planning that are more appropriate for the range of strategic and operational environments.

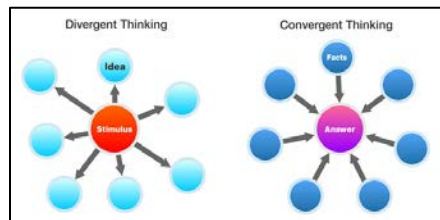


Figure 10: Divergent and Convergent Thinking Models⁴⁷

2. *Divergent planning.* In contrast to convergent planning (JOPP characteristic #3), divergent thinking is much more suitable for problems where there is no single “right”

answer. In applying divergent planning, planners aim to develop possible options rather than set solutions toward

fixed end states. Divergent thinking lies at the core of design methodology, and when employed in conjunction with a responsive operational execution construct would enable a “probe-sense-respond” style of approach that is best suited for tackling complex wicked problems.

3. *Design planning.* In accordance with the nature of complex problems, military planning doctrine must distinguish between the complicated and complex regimes of the Cynefin Framework. Complex regime situations require a “probe-sense-respond” methodology.

Applying a linear, universal Operational Approach technique will only serve to mis-categorize the environment, often creating conditions for disastrous results. Fast moving and ambiguous complex scenarios require a more responsive and investigational methodology. A wider range of diverse, unconventional, and nascent options must be considered and presented by planners.

Likewise, risk tolerance must also increase, as time is often working to confound the problem.

This is the nature of complex planning that is not reflected in JOPP. General George S. Patton, Jr. would most likely agree, for it was he who astutely advised, “a good plan, violently executed now, is better than a perfect plan next week.”

4. *Embrace “good enough.”* When approaching wicked problems, planners must be cautious how they define success. Complex problems cannot be “solved,” and offer no such terminal condition as “victory.” There is no “end state,” as the reverberations of previous actions will continue to generate effects throughout the environmental web. The best one can hope for is to realize a situation that is contextually “good enough.” Planners should therefore approach situations divergently, and attempt to develop options that will result in creating effects that fall within a range of acceptable outcomes, rather than seek to achieve a specific and untenable end state. Acceptable outcomes can then be tested against available means and ways to produce more options for senior leaders.

5. *Theater strategy is prime.* Theater strategies are foundational to all Geographic Combatant Command efforts short of execution of a conventional war. Theater plans reflect means to maintain stability - the more preferable state of affairs in a region. Therefore, creating, maintaining, and evaluating integrated and adaptive strategic theater planning efforts should be the primary focus of military planning organizations. Although the current military planning enterprise planning focus is intended to put primacy on theater planning efforts, these plans usually consist of repetitive and unsynchronized status-quo activities that more often than not serve to justify future resourcing. Meanwhile, the detailed planning enterprise focuses effort on contingency planning efforts. Contingency plans should be considered to be branch plans, and should be seamlessly nested into the larger theater strategy effort. Likewise, the larger theater strategy effort must be developed in conjunction with other the strategies of other theaters, as

complex geopolitical challenges are increasingly trans-regional and unbounded by artificial geographic borders.

6. *Empower the interagency.* If war is an instrument of politics (per Clausewitz), military plans should therefore be a subordinate and orchestrated instrument of a larger comprehensive theater strategic plan. This larger plan, however, cannot be created, maintained, and executed by the military alone. In fact, use of the military instrument alone can often prove counter-productive in a complex environment. True multi-domain planning requires more than just token involvement of interagency partners, as JP 5-0 prescribes.⁴⁸ Complex planning requires diversity of thought, experience, and perspective. Therefore, strategic planning efforts must be conducted as an interagency team, in support of unified interagency objectives. Military planners can provide their planning acumen and resources to these team efforts, but for wicked problems, military personnel may need to act in a supporting role. Regional campaign planning should always be employed in concert with and in support of the State Department regional desks and Embassy objectives. Optimally, this planning should be accomplished in a State Department physical space.

V. Conclusion

Joint Operational Planning, the current military planning doctrine prescribed by Joint Publication 5-0, is linear and mechanistic by nature. The process is predicated upon the pursuit of specific terminal end states, from which planners work backwards to identify a linear sequence of enabling objectives. It attempts to predict and steer future outcomes along a formulaic path. While this method is effective for straightforward military operations and

contingency planning, it is wholly inadequate for situations when a terminal end state is not readily apparent. Theater/global campaign plans and theater strategies offer no such end state, for they are naturally complex and unending. However, planning doctrine makes no discrimination between the two very different strategic environments, and instead prescribes a universal linear methodology that pays no mind to strategic complexity. This universal application leads military planners to apply mechanistic planning efforts to complex strategic problems, which can have disastrous consequences.

Conversely, the strategic environment is becoming increasingly dynamic, adaptive, and complex. Rival nations and non-state actors alike are increasingly turning to hybrid and unconventional methods for which conventional planning doctrine is poorly suited. Simultaneously, the geopolitical environment is becoming increasingly interconnected and obfuscated. Senior leaders require and deserve true options to address these complex situations. Military planning doctrine must adapt accordingly.

Ultimately, Joint Publication 5-0 is due for modernization. The doctrine must offer different tools to identify and operate within either the complicated or the complex realms. The Cynefin framework and design methodology are two such tools that should be incorporated into the doctrine. Adopting them will require leaders to adjust their perspectives of acceptable risk and initial failure to accommodate the necessary “probe-sense-respond” methodology required for these complex environments. If planners are freed from the repression of a one-size-fits all planning doctrine, they will be better equipped to develop more viable strategies for the dynamic and complex strategic environments the United States military is increasingly called upon to confront.

Notes

¹ Eisenhower, President Dwight D. “Remarks at the National Defense Executive Reserve Conference.” Washington, D.C., 14 November 1957.

² Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. II-5.

³ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. II-7.

⁴ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. II-21.

⁵ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. II-22.

⁶ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. II-22.

⁷ *JOPP* is the planning model used by the Joint force. Other similar models such as the U.S. Army’s *Military Decision Making Process* (MDMP) and the *Marine Corps Planning Process* (MCP) are also employed by the services. All various processes are similar in function and their linear methodology. Therefore, for purposes of this paper I have opted to refer only to *JOPP*, though the argument applies equally.

⁸ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. IV-1.

⁹ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. III-1.

¹⁰ “End State” is defined twofold. The Military End State is as “set of required conditions that defines achievement of all military objectives,” while the Strategic End State is defined as “the broadly expressed conditions that should exist after the conclusion of a campaign or operation.” Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: pp. xxxi, II-1 and III-7.

¹¹ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. IV-2.

¹² Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. III-15.

¹³ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. III-5.

¹⁴ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. xxv.

¹⁵ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. III-38.

¹⁶ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. III-39.

¹⁷ Sir Isaac Newton’s first law of motion states every object will remain at rest or in uniform motion in a straight line unless compelled to change its state by the action of an external force.

-
- ¹⁸ Jomini, Antoine-Henri. *The Art of War*. G. H. Mendell, and W. P. Craighill, trans, Mineloa, NY: Dover Publications, 2007: p. 15.
- ¹⁹ Bousquet, Antoine. *The Scientific Way of Warfare: Order and Chaos on the Battlefields of Modernity*. New York, NY: Columbia University Press, 2009: p. 30.
- ²⁰ Extrapolating Bousquet's theory, I offer that coming advances in Artificial Intelligence will be cause for addition of another metaphor: *Neural Warfare*.
- ²¹ Roy, Atreyee. "Convergent Thinking Vs Divergent Thinking." *Blogbigtime.com*, 3 February 2015. <http://www.blogbigtime.com/lifestyle/convergent-thinking-vs-divergent-thinking>
- ²² Charron, Phil. "Divergent Thinking Vs Convergent Thinking." *Thinkbrownstone.com*, 26 October 2011.
- ²³ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: p. III-38.
- ²⁴ von Clausewitz, Carl. *On War*. Edited and translated by Michael Howard and Peter Paret, Princeton, NJ: Princeton University Press, 1976. VIII:6, p. 605.
- ²⁵ von Clausewitz, Carl. *On War*. Edited and translated by Michael Howard and Peter Paret, Princeton, NJ: Princeton University Press, 1976. I:9, p. 80.
- ²⁶ Franks, Tommy. *American Soldier*. New York, NY: HarperCollins e-books, August 2004: p. 627. As Commander, US Central Command in 2003, in preparation for Operation Iraqi Freedom, General Franks was sensitive to Washington involvement in war planning and execution. In his memoirs, General Franks stated he passed this message to the Washington bureaucracy (NSC and DOD), if not in these exact words.
- ²⁷ Sanders, T. Irene. *Strategic Thinking and the New Science*. New York, NY: The Free Press 1998: p. 627.
- ²⁸ Williams, Garnett P. *Chaos Theory Tamed* (Joseph Henry Press, Washington, D.C. 1997), p. 194.
- ²⁹ Darwin, Charles. *The Origin of Species*. P.F. Collier, New York, NY, 1909.
- ³⁰ Stanley, Kenneth O. and Joel Lehman. *Why Greatness Cannot Be Planned: The Myth of the Objective*. Springer International Publishing, Switzerland, 2015: p. 6.
- ³¹ Rittel, Horst W., and Melvin M. Webber. "Dilemmas in a General Theory of Planning." *Policy Sciences* #4, Elsevier Scientific Publishing Company, Amsterdam 1973: p. 160.
- ³² Rittel, Horst W., and Melvin M. Webber. "Dilemmas in a General Theory of Planning." *Policy Sciences* #4, Elsevier Scientific Publishing Company, Amsterdam 1973: p. 160.

³³ von Clausewitz, Carl. *On War*. Edited and translated by Michael Howard and Peter Paret, Princeton, NJ: Princeton University Press, 1976. II:3, p. 149.

³⁴ Liang, Qiao and Wang Xiangsui, *Unrestricted Warfare*. Beijing: PLA Literature and Arts Publishing House, February 1999, pp. 145–46, as cited by Dr. Jeffrey Reilly, “Multidomain Operations: A Subtle but Significant Transition in Military Thought,” *Air and Space Power Journal* Spring 2016: pp. 61-73.

³⁵ Gerasimov, Valery. “On the Syrian Experience,” *VPK-News*, 9 March 2016, accessed 4 January 2016, <http://vpk-news.ru/articles/29579>. [Original text: “В современных конфликтах все чаще акцент используемых методов борьбы смещается в сторону комплексного применения политических, экономических, информационных и других невоенных мер, реализуемых с опорой на военную силу.”]

³⁶ Votel, Joseph L., Charles T. Cleveland, Charles T. Connett, and Will Irwin. “Unconventional Warfare in the Gray Zone.” *National Defense University Press*, 1 January 2016. <http://ndupress.ndu.edu/Media/News/tabid/7781/Article/643108/unconventional-warfare-in-the-gray-zone.aspx>.

³⁷ Votel, Joseph L., Charles T. Cleveland, Charles T. Connett, and Will Irwin. “Unconventional Warfare in the Gray Zone.” *National Defense University Press*, 1 January 2016. <http://ndupress.ndu.edu/Media/News/tabid/7781/Article/643108/unconventional-warfare-in-the-gray-zone.aspx>.

³⁸ Kaputsa, Phillip. “Whither Phasing?” Occasional Paper, United States Special Operations Command Donovan Group, 28 March 2016.

³⁹ Woodward, Bob. *Obama’s Wars*, New York: Simon and Schuster, 2010: p. 253.

⁴⁰ Woodward, Bob. *Obama’s Wars*, New York: Simon and Schuster, 2010: p. 258.

⁴¹ Non-Attributable Source, U.S. Department of State. To the author. E-mail, 10 January 2017.

⁴² Rittel, Horst W. J. and Melvin M. Webber. “Dilemmas in a General Theory of Planning.” *Policy Sciences* #4 (1973), Elsevier Scientific Publishing Company, Amsterdam 1973: p. 156.

⁴³ Snowden, David J. *The Cynefin Framework*. Cognitive Edge, YouTube.com, 5:15, 11 July 2010. <https://www.youtube.com/watch?v=N7oz366X0-8>.

⁴⁴ Kurtz, Cynthia F., and David J. Snowden. “The New Dynamics of Strategy: Sense-Making in a Complex and Complicated World.” *IBM Systems Journal* 42, no. 3 (2003): p. 462. <http://aufric.idm.oclc.org/login?url=http://search.proquest.com.aufric.idm.oclc.org/docview/222428634?accountid=4332>.

⁴⁵ “Un-order” is defined by Kurtz and Snowden not as an opposite to “order,” but instead to describe the natural emergence of order, in paradox to the concept of an imposed order. Kurtz, Cynthia F. and David J. Snowden: p. 465.

⁴⁶ Naveh, Shimon. *Systematic Operational Design Model* (v.1), as cited by Zweibelson, Ben. “An Application of Theory: Second Generation Military Design on the Horizon.” *Small Wars Journal*. 19 February 2017. <http://smallwarsjournal.com/jrnl/art/an-application-of-theory-second-generation-military-design-on-the-horizon>.

⁴⁷ Roy, Atreyee. “Convergent Thinking Vs Divergent Thinking.” *Blogbigtime.com*, 3 February 2015. <http://www.blogbigtime.com/lifestyle/convergent-thinking-vs-divergent-thinking>

⁴⁸ Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011: pp. II-35 and 36. “Through all stages of planning for campaigns, contingencies, and crises, CCDRs and subordinate JFCs should seek to *involve* relevant USG departments and agencies in the planning process.” “This common understanding enables interagency planners to more rigorously plan their efforts *in concert with* the military, to suggest other activities or partners that could contribute to the operation, and to better determine support requirements.”



Bibliography

Bousquet, Antoine. *The Scientific Way of Warfare: Order and Chaos on the Battlefields of Modernity*. New York, NY: Columbia University Press, 2009.

Charron, Phil. "Divergent Thinking Vs Convergent Thinking." *Thinkbrownstone.com*, 26 October 2011.

von Clausewitz, Carl. *On War*. Edited and translated by Michael Howard and Peter Paret, Princeton, NJ: Princeton University Press, 1976.

Darwin, Charles. *The Origin of Species*. P.F. Collier, New York, NY, 1909.

Eisenhower, President Dwight D. "Remarks at the National Defense Executive Reserve Conference." Washington, D.C., 14 November 1957.

Franks, Tommy. *American Soldier*. New York, NY: HarperCollins e-books, August 2004.

Gerasimov, Valery. "On the Syrian Experience," *VPK-News*, 9 March 2016, accessed 4 January 2016, <http://vpk-news.ru/articles/29579>. [Original text: "В современных конфликтах все чаще акцент используемых методов борьбы смещается в сторону комплексного применения политических, экономических, информационных и других невоенных мер, реализуемых с опорой на военную силу."]

Joint Publication (JP) 5-0, *Joint Operation Planning*, 11 August 2011.

Jomini, Antoine-Henri. *The Art of War*. G. H. Mendell, and W. P. Craighill, trans, Mineola, NY: Dover Publications, 2007.

Kaputsa, Phillip. "Whither Phasing?" Occasional Paper, United States Special Operations Command Donovan Group, 28 March 2016.

Kurtz, Cynthia F., and David J. Snowden. "The New Dynamics of Strategy: Sense-Making in a Complex and Complicated World." *IBM Systems Journal* 42, no. 3 (2003): p. 462. <http://aufric.idm.oclc.org/login?url=http://search.proquest.com.aufric.idm.oclc.org/docview/222428634?accountid=4332>.

Melville, Herman. *Moby Dick*. Alfred A. Knopf, Inc. New York, NY, 1907.

Non-Attributable Source, U.S. Department of State. To the author. E-mail, 10 January 2017.

Qiao Liang, and Wang Xiangsui, *Unrestricted Warfare*. Beijing: PLA Literature and Arts Publishing House, February 1999, as cited by Dr. Jeffrey Reilly, "Multidomain Operations: A Subtle but Significant Transition in Military Thought," *Air and Space Power Journal* Spring 2016, pp. 61-73.

Rittel, Horst W., and Melvin M. Webber. "Dilemmas in a General Theory of Planning." *Policy Sciences* #4, Elsevier Scientific Publishing Company, Amsterdam 1973: p. 160.

Roy, Atreyee. "Convergent Thinking Vs Divergent Thinking." *Blogbigtime.com*, 3 February 2015. <http://www.blogbigtime.com/lifestyle/convergent-thinking-vs-divergent-thinking>

Sanders, T. Irene. *Strategic Thinking and the New Science*. New York, NY: The Free Press 1998, p. 627.

Snowden, David J. *The Cynefin Framework*. Cognitive Edge, YouTube.com, 5:15, 11 July 2010. <https://www.youtube.com/watch?v=N7oz366X0-8>.

Stanley, Kenneth O. and Joel Lehman. *Why Greatness Cannot Be Planned: The Myth of the Objective*. Springer International Publishing, Switzerland, 2015.

Votel, Joseph L., Charles T. Cleveland, Charles T. Connett, and Will Irwin. "Unconventional Warfare in the Gray Zone." *National Defense University Press*, 1 January 2016. <http://ndupress.ndu.edu/Media/News/tabid/7781/Article/643108/unconventional-warfare-in-the-gray-zone.aspx>.

Williams, Garnett P. *Chaos Theory Tamed*. Joseph Henry Press, Washington, D.C., 1997.

Woodward, Bob. *Obama's Wars*, New York: Simon and Schuster, 2010, p. 253.

Zweibelson, Ben. "An Application of Theory: Second Generation Military Design on the Horizon." *Small Wars Journal*. 19 February 2017. <http://smallwarsjournal.com/jrnl/art/an-application-of-theory-second-generation-military-design-on-the-horizon>